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Our Reference: 9351-96

PRELIMINARY AMENDMENT

The Commissioner of Patents
& Trademarks
Washington, D.C.
20231, U.S.A.

Dear Sir:

**Re: New U.S. Divisional Patent Application of
United States Patent Application No. 09/592,950
For: CATALYTIC HUMIDIFIER AND HEATER FOR THE FUEL STREAM OF A FUEL CELL
Inventors: Xuesong Chen et al.**

We are simultaneously filing herewith a divisional application of United States patent application serial number 09/592,950 filed on June 13, 2000. Please enter the following amendment in the divisional application.

In the Specification:

Please insert the following paragraph on page 1, line 4 as follows:

--The present application is a divisional of USSN 09/592,950 that was filed on June 13, 2000 (now pending).—

Please amend the paragraph on page 9, lines 20-25 to read as follows:

--Reference will now be made to Figures 2 and 5, which shows a third embodiment of the present invention. This embodiment of the invention again can have an enclosure, as indicated at 60, and again includes a fuel cell stack, here indicated at 62. The stack 62 here is a closed stack, and is provided with an air pump or blower 64 connected by a main supply line 66 to an inlet of the fuel cell stack 62, and excess air exhausts from the fuel cell stack 62 as indicated at 68.—

Please amend the paragraph on page 12, lines 1-15 to read as follows:

--Reference will now be made to Figure 4. This shows a plan view of, for example five pairs of flow field plates making up five individual fuel cell elements in the

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fuel cell stack 62. Thus, there are oxidant flow field plates indicated at 110. Fuel flow field plates are indicated at 112. Between each pair of oxidant and fuel flow field plates 110,112, there is located a respective membrane electrode assembly (MEA) and gas diffusion media 114. Between the oxidant flow field plates 110 and the MEA 114, there are defined oxidant channels 116, and fuel flow hydrogen channels 118 are defined between the fuel flow field plates 112 and the MEA 114. Cooling channels 120 are provided in the back of the oxidant flow field plates 110, against the fuel flow field plates 112. These cooling channels 120 are, like the oxidant channels 116, simply channels extending vertically (not necessarily vertical) through the stack 62, to provide free flow or ambient air through the channels. Thus, a stack with this configuration, is intended as an air-breathing stack, as mentioned above, and can be incorporated into the embodiments of the earlier figures. In known manner, other constructional details of the stack, e.g. elements holding the various flow field plates together, are not shown, but these can be conventional.

In the Drawings:

Formal drawings for the application, corresponding to the originally filed drawings, are attached.

In the Claims:

Please delete claims 4 –16 currently of record leaving claims 1-3 pending in the divisional application.

Please amend claim 1 to read as follows:

1. A tubular reactor, for catalyzing reaction of hydrogen and a gaseous oxidant, the tubular reactor comprising:

an elongated housing, a first inlet for a gaseous fuel and a second inlet for a gaseous oxidant, both first and second inlets being provided at one end of the elongated housing and an outlet at the other end of the housing; and

a catalyst formed from a material adapted to promote catalytic combustion of the fuel and the oxidant, being formed into an elongated body substantially filling the elongated housing and being porous, whereby, in use, the catalyst promotes combustion between the fuel and the oxidant to generate heat and moisture, whereby a heated and humidified gas flow exits through the outlet.

Please enter a new claim 4 as follows:

4. A tubular reactor as claimed in claim 3, wherein the fittings for the first and second inlets, comprise a T-connector including 3 coupling flanges, one being connected to the tubular housing and the other two flanges providing the first and second inlets, and the fitting for the outlet comprises a connector with a pair of flanges, one flange being connected to the tubular housing and the other flange of the connector forming the outlet.

Remarks

Please calculate the claim fee after the present amendment is entered.

Claim 1 is being amended solely to render the claim more definite, and the same features have been retained in this claim as were in the original claim.

The amendment to page 9 merely indicates that Figures 2 and 5 refer to the same embodiment, as already indicated in the list of Figures. The amendment to page 12 merely indicates that the disclosed open structure is an air-breathing configuration, as mentioned at the head of page 6. No new matter has been added

Attached hereto is a marked-up versions of the changes made to the specification and claims by the current amendment. The attached page is captioned "version with markings to show changes made".

Entry of the above preliminary amendment is respectfully requested.

Respectfully submitted,

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/elb
Encl.

VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Specification:

The following paragraph has been entered on page 1, line 4:

The present application is a divisional of USSN 09/592,950 that was filed on June 13, 2000 (now pending).

The paragraph on page 9, lines 20-25 has been amended as follows:

--Reference will now be made to ~~Figure 2~~ Figures 2 and 5, which shows a third embodiment of the present invention. This embodiment of the invention again can have an enclosure, as indicated at 60, and again includes a fuel cell stack, here indicated at 62. The stack 62 here is a closed stack, and is provided with an air pump or blower 64 connected by a main supply line 66 to an inlet of the fuel cell stack 62, and excess air exhausts from the fuel cell stack 62 as indicated at 68.—

The paragraph on page 12, lines 1-15 has been amended as follows:

--Reference will now be made to Figure 4. This shows a plan view of, for example five pairs of flow field plates making up five individual fuel cell elements in the fuel cell stack 62. Thus, there are oxidant flow field plates indicated at 110. Fuel flow field plates are indicated at 112. Between each pair of oxidant and fuel flow field plates 110,112, there is located a respective membrane electrode assembly (MEA) and gas diffusion media 114. Between the oxidant flow field plates 110 and the MEA 114, there are defined oxidant channels 116, and fuel flow hydrogen channels 118 are defined between the fuel flow field plates 112 and the MEA 114. Cooling channels 120 are provided in the back of the oxidant flow field plates 110, against the fuel flow field plates 112. These cooling channels 120 are, like the oxidant channels 116, simply channels extending vertically (not necessarily vertical) through the stack 62, to provide free flow or ambient air through the channels. Thus, a stack with this configuration, is intended as an air-breathing stack, as mentioned above, and can be incorporated into the embodiments of the earlier figures. In known manner, other constructional details of the stack, e.g. elements holding the various flow field plates together, are not shown, but these can be conventional.

In the Claims:

Claims 4 –16 have been deleted.

Claim 1 has been amended as follows:

1. A tubular reactor, for catalyzing reaction of hydrogen and a gaseous oxidant, the tubular reactor comprising:

an elongated housing, a first inlet for a gaseous fuel and a second inlet for a gaseous oxidant, both first and second inlets being provided at one end of the elongated housing and an outlet at the other end of the housing; and

a catalyst formed from a material adapted to promote catalytic combustion of the fuel and the oxidant, being formed into an elongated body substantially filling the elongated housing and being porous, ~~a first inlet for a gaseous fuel and a second inlet for a gaseous oxidant, both first and second inlets being provided at one end of the elongated housing and an outlet at the other end of the housing;~~ whereby, in use, the catalyst promotes combustion between the fuel and the oxidant to generate heat and moisture, whereby a heated and humidified gas flow exits through the outlet.

Please enter a new claim 4 as follows:

4. A tubular reactor as claimed in claim 3, wherein the fittings for the first and second inlets, comprise a T-connector including 3 coupling flanges, one being connected to the tubular housing and the other two flanges providing the first and second inlets, and the fitting for the outlet comprises a connector with a pair of flanges, one flange being connected to the tubular housing and the other flange of the connector forming the outlet.